THE TABULATE CORAL GENUS *CYSTIHALYSITES* FROM WENLOCK AND DUDLEY

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ABSTRACT. Examination of halysitid corals from the Wenlock Limestone of Shropshire and Worcestershire has revealed a number of colonies with large corallites. These are referred to *Cystihalysites*, a genus which has not previously been recorded from Britain. Its diagnosis is discussed, and two new species *C. westwoodensis* and *C. blakewayensis* are described.

DURING the course of a revision of Wenlockian tabulate corals from Wenlock and Dudley it has been found that a number of halysitid specimens can be referred to *Cystihalysites* Tchernychev 1941. In all probability similar specimens have been previously referred to the species *Halysites catenularius* (Linn.). Nicholson (1879, p. 228, pl. xi, fig. 1*a*) figured a specimen which he called *Halysites catenularia*, possessing corallites of unusually large size, the mesocorallites with subvesicular tabulae. Thus this specimen appears to belong to *Cystihalysites*. No other description of these large forms of the Halysitidae has been found. Two new species of this genus have so far been collected from the Wenlock Limestone, and are named *C. westwoodensis* and *C. blakewayensis*. The figured specimens in this paper are referred to by their Register Numbers in the British Museum (Natural History).

Genus CYSTIHALYSITES Tchernychev 1941.

1941 *Cystihalysites*, Tchernychev, p. 70, pl. ii, 5–7, pl. iii, 1–6.
1956 *Cystihalysites*, Duncan, p. 222, pl. 27, 3 *a–f*.
1957 *Cystihalysites*, Hamada, p. 397.
1962 *Cystihalysites*, Norford, p. 34, pl. x, 1–8, xi, 1–9.

Type species. Cystihalysites mirabilis Tchernychev 1941, p. 70, pl. ii, figs. 5–7, pl. iii, figs. 1–6. Middle course of the Khandyga River, E. Verkhojanie. Upper Silurian.

Original Diagnosis. The following is a translation from the Russian of Tchernychev's (1941, p. 70) diagnosis.

'Coralla consisting of long dimorphic corallites joined laterally and forming longitudinally furrowed palisades, one corallite thick, which are curved and joined forming a colony as in the genus *Halysites*. In transverse section the corallites are almost rounded or elliptical. Internally arranged between each pair of such corallites, with their numerous transverse tabulae, is one rectangular mesocorallite with vesicular tabulae resembling vesicular tissue. On the convex side of the vesicles, spines of the same type as the aculae [the vertical elements arising from the convex side of the domed plates of the coenenchyme] of *Propora* are found. Walls are without pores. On the walls on the inside of the autocorallites small vesicles are arranged which also bear sparse aculae. The spines on the inside of the autocorallites are sparse and weakly developed and are absent on the inside of the mesocorallite. Reproduction by budding.'

[Palaeontology, Vol. 7, Part 3, 1964, pp. 452–7, pl. 74.]

Hamada (1957), in his classification of the Halysitidae, stated that *Cystihalysites* was aseptate and also possessed incomplete tabulae in the mesocorallites. Unfortunately he did not have access to Tchernychev's paper, which is itself slightly misleading, for although Tchernychev stated in the diagnosis of the genus that the tabulae of the mesocorallites were cystose, he mentioned complete highly convex tabulae locally present in the mesocorallites of *C. mirabilis*.

Tchernychev (1941, p. 70) noted that spines were sparsely developed on the walls of the autocorallites. These are possibly septal structures, for Norford (1962, p. 36, pl. xi, fig. 2) recorded septal spines in a species of *Cystihalysites* from the Sandpile Group (Silurian) of Canada, and septal spines are also present in *C. blakewayensis*, one of the British Wenlock species.

Tchernychev (1941) described the presence of cystose tabulae lining the inside of the autocorallite wall, and stated it to be a characteristic of the genus. Norford (1962, p. 36) noted that it was present in only one corallum of his *Cystihalysites sp. 2* and suggested that it is an inconstant character within the genus. In both the new species here described only rarely is there any indication of such tabulae and then only on parts of the autocorallites bordering the mesocorallites.

In his drawings of *C. mirabilis* Tchernychev (1941, pl. iii, figs. 2–6) showed a distinct wall separating the mesocorallites and autocorallites. Many species of the genus, however, have been shown to possess no distinct wall between the two types of corallites (Norford 1962, p. 35), but have a boundary built up by the sides of the convex tabulae of the mesocorallites bending down to lie on the sides of underlying tabulae (Pl. 74, fig. 7).

Spines on the convex side of the mesocorallite tabulae in *Cystihalysites*, similar to the aculae of *Propora*, described by Tchernychev (1941), do not occur in the two species to be described. They have not been noted by other authors in species of *Cystihalysites*, suggesting that this is not a common character within the genus.

Emended Diagnosis. Coralla consisting of long dimorphic corallites joined laterally into chains which divide and anastomose to form fenestrules. In transverse section the autocorallites are rounded or elliptical, separated by rectangular mesocorallites. Tabulae of the autocorallites usually complete, occasionally incomplete. Tabulae of the mesocorallites incomplete and vesicular, or highly convex upwards. Septal spines sometimes present. Boundary between autocorallites and mesocorallites formed either by the tabulae of the mesocorallites, or, less commonly, by a true wall separating the two corallites. Vesicles on the inside of autocorallite walls occasionally present. Increase interstitial and peripheral.

Cystihalysites westwoodensis sp. nov.

Plate 74, figs. 1, 2

Name. From the locality of the holotype.

Holotype. R44889. Quarry on the south side of the Church Stretton–Much Wenlock road, 100 yds. east of Stretton Westwood Methodist Church, Stretton Westwood, Shropshire. Grid Ref. 598987, Ordnance Survey 1-inch Sheet 129.

Diagnosis. Cystihalysites possessing very large autocorallites averaging 2·61 mm. in longer transverse axis and 3·33 mm. in external width, and the mid-points of consecu-

tive autocorallites averaging 3·7 mm. apart. Mesocorallites large with mean measurements 1·0 mm. (width) ×1·11 mm. and with vesicular to subvesicular tabulae.

Description. This species is invariably represented by specimens with few corallite chains, apparently broken parts of larger coralla. None show the shape of the fenestrules, but there are indications in the holotype that they are rectangular. Some of the chains are long with up to eight or more corallites in them. The epitheca shows fine growth lines with between fifteen and twenty to the mm. and coarser growth lines with varied separation from each other, averaging just under 1 per 1 mm. The increase of the corallites is interstitial and peripheral, peripheral being dominant. The corallites attain maximum diameter in about 1 mm. growth.

Transverse sections. The autocorallite and mesocorallites alternate. The autocorallites are large with their lumen almost circular, but elongated slightly along the lengths of the chains, with the dimensions of the holotype averaging 3·33 mm. in width (external measurement) by 2·61 mm. in the longer transverse axis, and 3·7 mm. from mid-point of one autocorallite to mid-point of the next. The mesocorallites are rectangular in transverse section, and average measurements are 1·00 mm. × 1·11 mm. (internal measurements), being elongated slightly along the lengths of the chains. The outer walls of the holotype average 0·5 mm. in thickness in the autocorallites, and 0·48 mm. in the mesocorallites, and have an inner and outer layer. No septal spines were seen in either type of corallite.

Longitudinal sections. Some of the tabulae of the autocorallites are complete and horizontal or nearly horizontal, while others are incomplete being bent sharply downwards to rest on underlying tabulae. Three succeeding tabulae may be bent downwards to meet the same underlying tabula (Pl. 74, fig. 1). In the holotype the tabulae have a mean separation of 1·03 mm. from each other. The tabulae of the mesocorallites are vesicular or subvesicular. No true wall occurs between the mesocorallites and the autocorallites,

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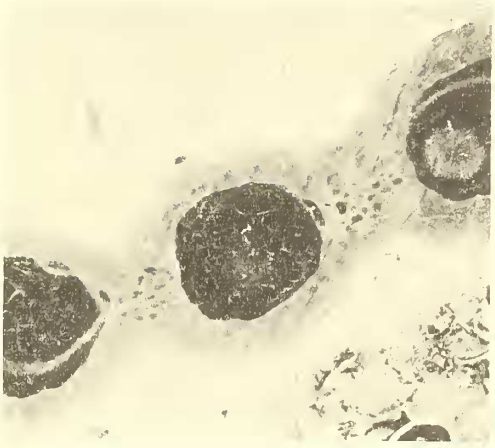
EXPLANATION OF PLATE 74

Figs. 1 and 2, *Cystihalysites westwoodensis* sp. nov. 1, R44891, Wenlock Limestone, Dudley. Longitudinal section showing incomplete tabulae in the autocorallites and vesicular tabulae in the mesocorallites, ×8. 2, R44889, holotype. Transverse section showing shape of corallites, vesicular tabulae in the mesocorallites and wall thickness, ×8.

Figs. 3–7, *Cystihalysites blakewayensis* sp. nov. 3, R44890, holotype. Transverse section showing shape of lacunae, ×3. 4, R44890, holotype. Transverse section showing shape of corallites, wall thickness and the tabulae of the mesocorallites, ×8. 5, R44892. Wenlock Limestone, Stretton Westwood, Shropshire. Longitudinal section which at the top right passes very close to a wall, where the septal spines are shown in cross section as small dots. In the other autocorallite, vesicles on the margin of the wall are shown in one part, ×8. 6, R44893. Wenlock Limestone, Stretton Westwood, Shropshire. Transverse section through corallites infilled with sediment, showing occasional septal spines, ×8. 7, R44890, holotype. Longitudinal section showing concave up tabulae in the autocorallites, highly convex tabulae in the mesocorallites, and boundary between the autocorallites and mesocorallites formed by mesocorallite tabulae, ×8.

1



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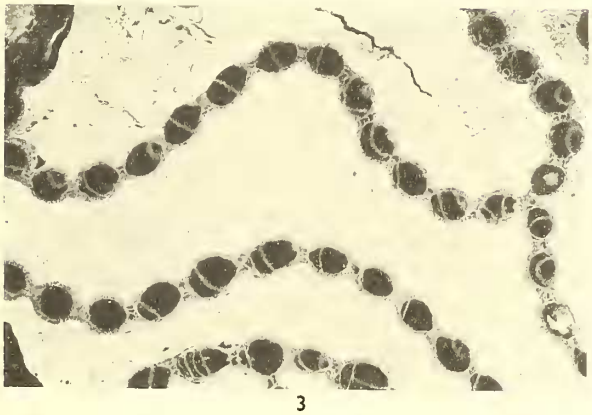

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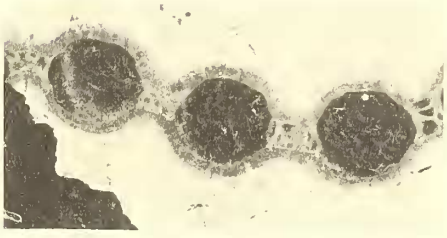

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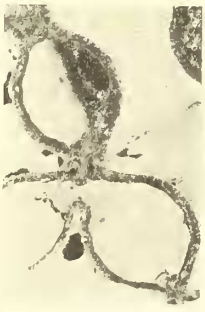

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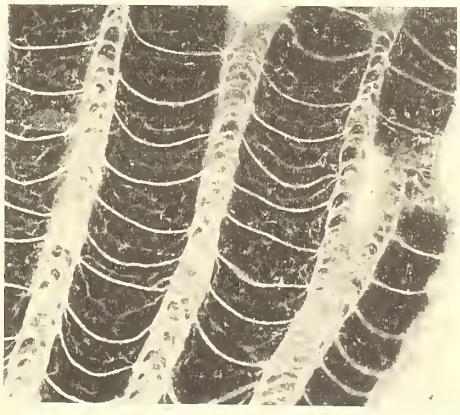

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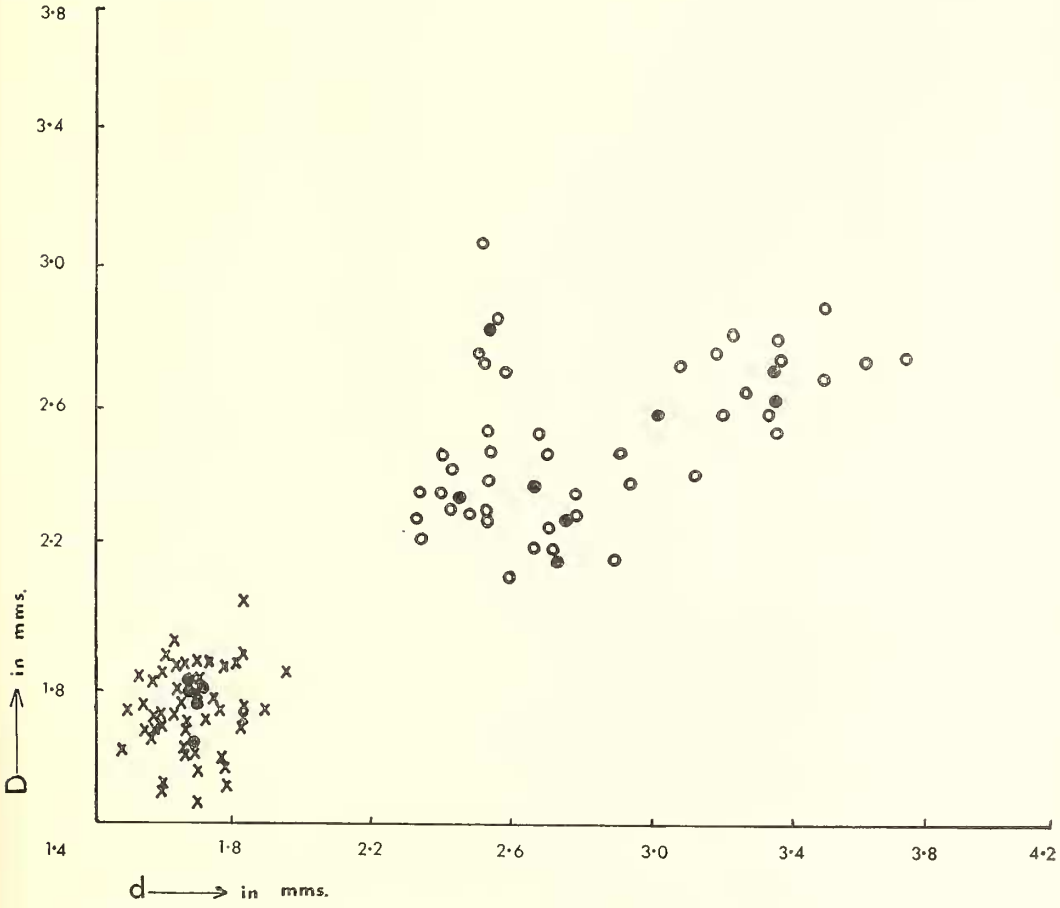
but the margins of the vesicular tabulae bend down and lie on the sides of the underlying tabulae to form a boundary between the two types of corallite.

Distribution. This species has been collected from the Wenlock Limestone of Wenlock Edge and Dudley.



TEXT-FIG. 1. Diagram showing the size ranges of the autocorallites of *Cystihalysites westwoodensis* and *C. blakewayensis.*

D = Longer transverse axes of the autocorallites
d = External width of autocorallites
o = Corallites of specimens of *C. westwoodensis*
x = Corallites of specimens of *C. blakewayensis*
● = Means of each corallum

Discussion. C. westwoodensis differs from *C. magnitubus* (Buehler 1955, p. 68, pl. 2, figs. 1–3) in the incomplete tabulae of the autocorallites, the tabulae of the smaller mesocorallites being more vesicular, and in the greater thickness of the outer wall of the corallites, which averages 0·20 mm. in *C. magnitubus* according to Norford (1962, p. 34).